

## Potential and Kinetic Energy Worksheet

**Kinetic Energy (KE) =  $\frac{1}{2}$  mass times velocity squared**

$$KE = \frac{1}{2} mv^2$$

**Potential Energy (PE) = mass times the acceleration due to gravity times height**

$$PE = mgh = N \cdot h \quad (g = 9.8 \text{ m/s}^2)$$

$$1 \text{ Newton (N)} = 1\text{kg} \cdot 1\text{m/s}^2 \text{ or } 1\text{kgm/s}^2$$

1. You serve a volley ball with a mass of 2.1kg. The ball leaves your hand at 30m/s. The ball has \_\_\_\_\_ energy. Calculate it.
  
  
  
  
  
  
  
  
  
  
2. There is a bell at the top of a tower that is 45m high. The bell weighs 190N. The bell has \_\_\_\_\_ energy. Calculate it.
  
  
  
  
  
  
  
  
  
  
3. The potential energy of an apple is 6.0 joules. The apple is 3m high. What is the mass of the apple?
  
  
  
  
  
  
  
  
  
  
4. What is the velocity of a 500kg elevator that has 4000J of energy?

5. What is the mass of an object that creates 33,750J of energy by traveling at 30m/s?
  
6. Missy Diwater, the former platform diver for the Ringling Brothers' Circus had a kinetic energy of 15,000J just prior to hitting the bucket of water. If Missy's mass is 50kg, the what was her velocity?
  
7. A 75kg refrigerator is located on the 70<sup>th</sup> floor of a skyscraper (300m above ground). What is the potential energy of the refrigerator?
  
8. At what height is an object that has a mass of 50kg, if its gravitational potential energy is 9800J?
  
9. A 10kg mass is lifted to a height of 2m. What is its potential energy at this position?

10. Calculate the kinetic energy of a truck that has a mass of 2900kg and is moving at 55m/s.
11. A bullet has a mass of 0.0042kg. The muzzle velocity of the bullet coming out of the barrel of the rifle is 993m/s. What is the KE of the bullet as it exits the gun barrel?
12. What is the potential energy of a 3kg ball that is on the ground?
13. A roller coaster is at the top of a 72m hill and weighs 966N. At the top of the hill the coaster car has \_\_\_\_\_ energy. Calculate it.
14. What is the kinetic energy of a 3kg ball that is rolling 2m/s?
15. A baby carriage is rolling down a hill at 18m/s. If the carriage has 90J of kinetic energy, what is the mass of the carriage?